Freshwater Sediment Quality Values for Washington State

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WASHINGTON STATE DEPARTMENT OF ECOLOGY

Participants

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Phase I - 2002

- Compile synoptic chemistry/bioassay data
- Screen and quality assure data
- Program SEDQUAL bioassay SQV comparison tool
- Compile and evaluate existing SQV sets against narrative program criteria
- Assess reliability of best-scoring SQV sets
- Exploratory work for Phase II

Phase I Results

- None of the existing SQVs were found to be reliable enough for stand-alone use
- More complete database allows calculation of AETs/SQVs for two new endpoints - *Chironomus* mortality and *Chironomus* growth
- Comparison to control produced better reliability than comparison to reference; mixed reference and control had much lower reliability

Phase II - 2003

- Additional SEDQUAL updates
- Recalculation of FW AETs:
  - *Hyalella azteca* 10-day mortality
  - *Chironomus tentans* 10-day mortality
  - *Chironomus tentans* 10-day growth
  - Microtox 15-minute luminescence
- Calculation of alternative guidelines:
  - Optimal/alternative percentiles for AETs
  - Error rate minimization techniques (floating percentiles)
- Reliability assessment

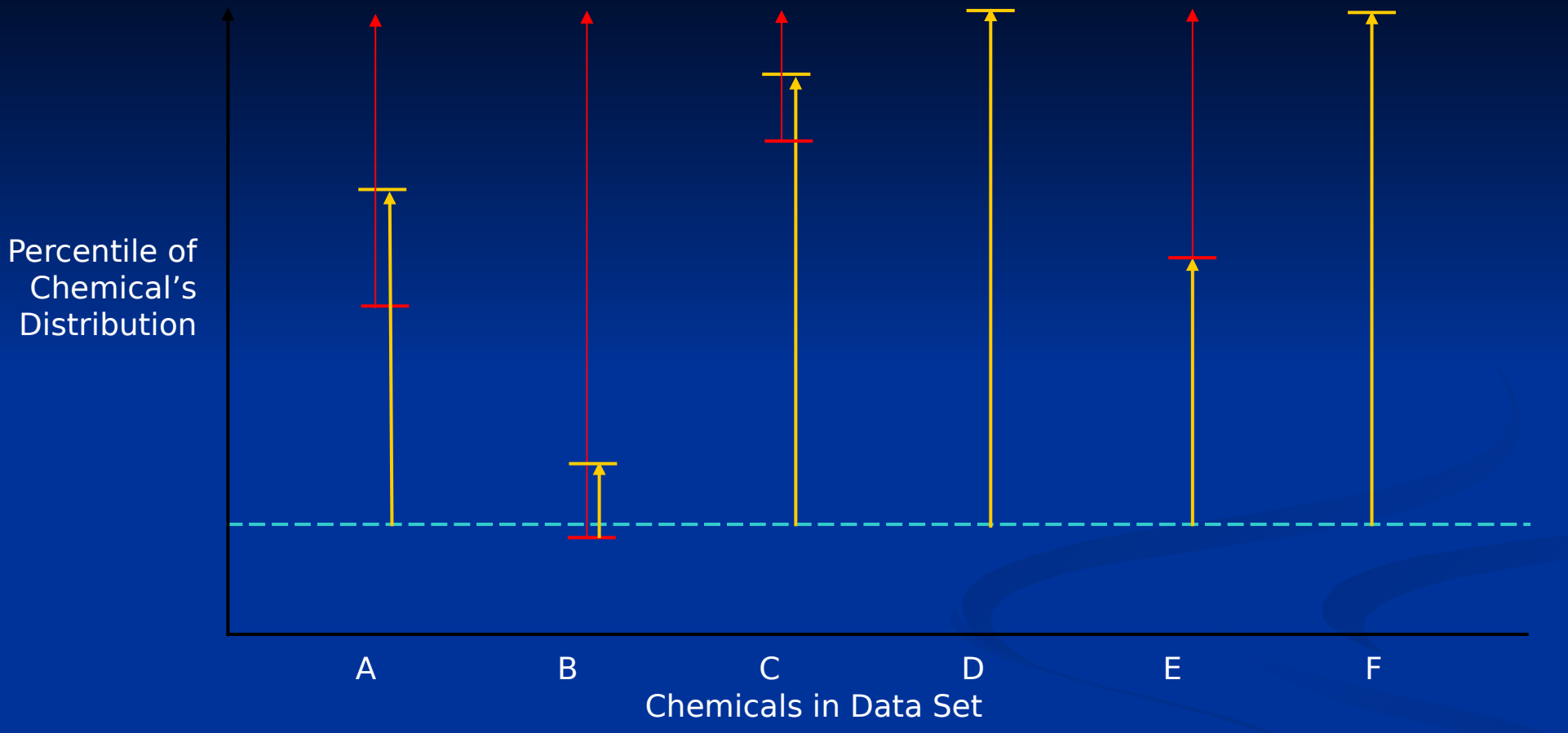
Phase II Results

- Updated AETs still appear to have low sensitivity - could be due to variation in metals bioavailability
- Choosing a lower no-hit percentile (70th to 95th) for AETs reduces error rates by 20% or so but some error rates are still too high
- Floating percentile FW guidelines have false negatives 15%, false positives 25%, overall accuracy of 80+%
- Best accuracy when metals are set low, PAHs high
- PAH summing does not appear to improve reliability, but may still be appropriate based on theoretical considerations

Floating Percentile Method

- Select toxicity tests and endpoints
- Compile synoptic chemistry/bioassay data
- Assign biological hit/no-hit status
- Develop chemical distributions
- Select a range of target false negative rates and identify associated optimal percentile values
- Adjust percentiles for individual chemicals upward to reduce false positives, maintaining same low false negative rate

Floating Percentile Diagram



Possible RSET Development Tasks

- Evaluate reliability of FP SQGs for use as part of RSET using Columbia River subset of data
- Use new data sets to field-validate and/or adjust FP SQGs
- Calculate Columbia River-specific SQGs using FP method
- Calculate SQGs for additional chemicals of interest in the Columbia River system (e.g., agricultural chemicals)